



PATENT  
Attorney Docket No. **ICR 97/026**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Brian Jay **DOERKSEN** )  
 )  
Application No.: 09/872,390 ) Group Art Unit: 1764  
 )  
Filed: June 1, 2001 ) Examiner: Alexa A. Doroshenk  
 )  
For: **ALTERNATE COKE FURNACE TUBE** )  
 **ARRANGEMENT** )

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

RECEIVED  
MAY 25 2004  
TC 1700

**DECLARATION OF BRIAN JAY DOERKSEN  
UNDER 37 CFR § 1.131**

I, Brian Jay Doerksen, declare as follows:

1. I am the inventor of the invention described and claimed in United States Patent Application Serial No. 09/872,390, entitled "ALTERNATE COKE FURNACE TUBE ARRANGEMENT," filed June 1, 2001 ("USSN 09/872,390") ("the Application") and assigned to Conoco Inc. ("Conoco"), now merged with and into ConocoPhillips Company.

2. I conceived my invention and described it in a document entitled "Conoco Inc. Invention Disclosure" signed and dated by me prior to July 20, 1999 and thus prior to

the effective filing date of either Barnett et al. (US 6,237,545 B1) or Gibson et al. (US 6,241,855 B1). [Exhibit 1] My invention disclosure describes and depicts in drawings a staggered tube layout for the radiant section of a double fired heater. [Exhibit 1 at page 2 states: "Attached are two sketches of an alternate staggered tube layout for the radiant sections of double fired heaters." The drawings are at pages 4 and 5 of Exhibit 1]

3. The date deleted from Exhibit 1 is prior to July 20, 1999.

4. I and others worked substantially continuously towards implementing the ALTERNATE COKE FURNACE TUBE ARRANGEMENT (the "Invention") and towards filing a patent application for the same from a date prior to July 20, 1999 to the filing date of the Application. My actions, and the action of others, included the activities detailed hereinafter.

5. From 1994 until 2002, Conoco was obligated by an agreement referred to as the "Conoco-Bechtel Alliance Agreement" to share new developments in delayed coking technology with Bechtel Corporation, its exclusive agent for licensing of the Conoco Coking Process, and an Alliance Steering Committee comprised of employees of both Conoco and Bechtel had responsibility for directing projects and allocating funds to develop coking technology, including the Invention.

6. During the period of time from prior to July 20, 1999 to the filing date of the Application, the Alliance Steering Committee worked to develop a validated computational fluid dynamics ("CFD") model to evaluate furnace designs including the Invention with an ultimate view towards implementing the Invention in commercial plant operations.

7. Because of the operational importance of implementing new furnace designs in commercial plant operations, it is necessary to thoroughly evaluate new furnace designs prior to implementation. The Alliance Steering Committee designated the program for evaluating furnace designs including the Invention the "Radiant Furnace CFD Validation Study". The Alliance Steering Committee met on September 30, 1999, among other reasons, to discuss this Study. **[Exhibit 2]**

8. During this same time period of evaluating the Invention, evaluation of patent coverage for the Invention was also under way.

9. On information and belief, prior to July 20, 1999, responsibility for patent acquisition relating to the Invention was assigned to Mr. William Hall of Conoco's Patent and Licensing Department in Conoco's Ponca City, Oklahoma office.

10. On information and belief, on September 14, 1999, in a Coke and Carbon Products IP Meeting attended by Mr. Hall, the Invention was reviewed, which lead to a recommendation to conduct a preliminary patentability study to support filing patent applications in the United States and internationally. **[Exhibit 3]**

11. In December 1999, the Alliance Steering Committee met again and, among other tasks, reviewed progress on the Radiant Furnace CFD Model Validation Study, including the scope of work completed as of December 1999, the scope of work remaining, and the costs associated with the project. **[Exhibit 4]**

12. On information and belief, in a letter dated January 7, 2000, Mr. Hall requested that Mr. Mark Kachigian, with the law firm of Head, Johnson & Kachigian, conduct a preliminary patentability evaluation of the Invention.

13. On information and belief, on or about March 1, 2000, responsibility for patent acquisition for the Invention was transferred to Mr. Hsiang-Ning Sun when he joined Conoco's Patent and Licensing Department in Conoco's Houston, Texas office.

14. On March 1, 2000, the Alliance Steering Committee met and reviewed the status of technology development projects, including the Radiant Furnace CFD Study. As a result of this meeting, the Steering Committee directed the Technology Committee to recommend new procedures for evaluating and managing technology development projects, including the Radiant Furnace CFD Study. **[Exhibit 5]**

15. On information and belief, in a letter dated March 20, 2000 addressed to Mr. Hall in Conoco's Ponca City, Oklahoma office, Mr. Kachigian reported the results of the preliminary patentability evaluation of the Invention.

16. On December 7, 2000, the Alliance Steering Committee met and, among other things, was briefed by the Technology Committee on recommended new procedures for evaluating and managing technology development projects. As a result of the meeting, recommended new procedures for evaluating and managing technology development projects, including the Radiant Furnace CFD Study, were implemented. **[Exhibit 6]**

17. On information and belief, on January 10, 2001, a New Carbon Products and Global Carbon Intellectual Property Team meeting attended by Mr. Sun resulted in a recommendation to file a patent application for the Invention. **[Exhibit 7]**

18. On information and belief, as a result of the Intellectual Property Team Meeting, on or about January 18, 2001, a request was sent to Mr. Kachigian to draft a patent application for the Invention. **[Exhibit 8]**

19. Continuing its efforts to evaluate the Invention and to provide technical verification in support of patent acquisition efforts under the procedures implemented in December 2000, the Alliance Steering Committee considered authorizing additional evaluations of the Invention in the form of detailed CFD evaluations. **[Exhibit 9- Mr. John Ward March 2, 2001 e-mail and attached Coking Alliance Technology Development Project Approval Form]**

20. On information and belief, on or about May 4, 2001, Mr. Kachigian telephoned Mr. Sun to inform him that Mr. Kachigian had a client representation conflict and that he was unable to complete drafting of a patent application for the Invention. **[Exhibit 10]**

21. On information and belief, following Mr. Kachigian's telephone call to Mr. Sun, on or about May 9, 2001, Conoco retained another law firm to complete drafting of a patent application for the Invention.

22. On June 1, 2001, the Application was filed with the United States Patent and Trademark Office.

23. I declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both under Section 1001 of Title 18 of the

United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Brian J. Doerksen". The signature is fluid and cursive, with a long horizontal stroke at the end.

Brian Jay Doerksen

**EXHIBITS**

**to**

**DECLARATION OF BRIAN JAY DOERKSEN**

**UNDER 37 CFR § 1.131**

Send to: Patent and Licensing Division  
Conoco Inc.  
Ponca City, OK 74603

Conoco Inc. ICR  
Invention Disclosure

Redacted  
EXHIBIT 1  
1 of 5

1. Descriptive title of invention. ALTERNATIVE COIL ARRANGEMENT FOR DOUBLE FIRED PROCESS FURNACES.
2. (a) Problem(s) invention solves. LOWER PRESSURE DROP, LESS DECOKING EROSION, LOWER FURNACE & FOUNDATION CONSTRUCTION COSTS, BETTER HEAT CONSERVATION (LESS BOX AREA), FLEXIBILITY IN DESIGN.
- (b) Ways others have addressed the problem(s). \_\_\_\_\_
3. (a) Pertinent articles and patents (attach copies, when available). \_\_\_\_\_
- (b) Other related ICRs. \_\_\_\_\_
4. (a) Has the invention been disclosed (or are there plans to disclose the invention) outside of Conoco? (To whom, when?)  
YES, TO BECHTEL ENGINEERS TO HELP EVALUATE FIRE SIDE EFFECTS OF THIS DESIGN. THE BECHTEL ENGINEERS ARE IN THE CONOCO-BECHTEL COOKING ALLIANCE.
- (b) Has the invention been used or are there plans for future usage? (When, where?)  
IF FURTHER DEVELOPMENT IS AS PROMISING AS EARLY EVALUATION, WILL BE A VALUABLE DESIGN FOR SERVICES SUCH AS COOKING.
5. First documentation (notebook reference, memo, etc.) and date of invention. SEE ATTACHED NOTE DATED \_\_\_\_\_ IDEA PRE-DATES THIS BY A COUPLE OF MONTHS, I DISCUSSED THIS W/ PAUL STEELE DURING THE MIDOR PFD REVIEW MEETING.
- Please advise the Patent and Licensing Division of any changes regarding use and/or outside disclosure of this invention.

Witness:  
I have examined and fully understand the attached description.

JIM ROTH

Witness' Name (print or type)

Witness' Signature

Date

Witness' Name (print or type)

Witness' Signature

Date

BRIAN JAY DOERKSEN  
Inventor's Full Name (print or type)  
Brian Jay Doerksen  
Inventor's Signature

TECHNOLOGY  
640-4513  
Dept. and Phone  
Date

Inventor's Full Name (print or type)

Dept. and Phone

Inventor's Signature

Date

Inventor's Full Name (print or type)

Dept. and Phone

Inventor's Signature

Date

Inventor's Full Name (print or type)

Dept. and Phone

Date

COKE/Fuel Process

COKE/CARBON PRODUCTS IP TEAM MEMBERS-CRS-BJD-Bound-Patent Estate Book

For Action:

ICR No. \_\_\_\_\_ (P&L use only)

Information:

Page 1 of 5



To Jim Roth and Gary Hughes  
From Brian Doerksen

## AN ALTERNATE COIL LAYOUT FOR DOUBLE FIRED HEATERS?

Attached are two sketches of an alternate staggered tube layout for the radiant sections of double fired heaters. It uses all long radius return bends.

### ADVANTAGES?

Lower pressure drop through the radiant section.

Less return bend erosion during decokes due to long return bend geometry.

One third shorter fire box.

More efficient - less surface area, less heat loss.

Less Fabrication costs, less materials.

Less foundation costs.

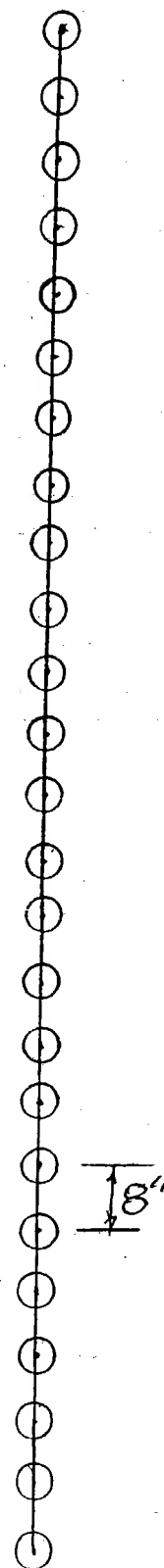
Thanks for your patience,

*Brian*

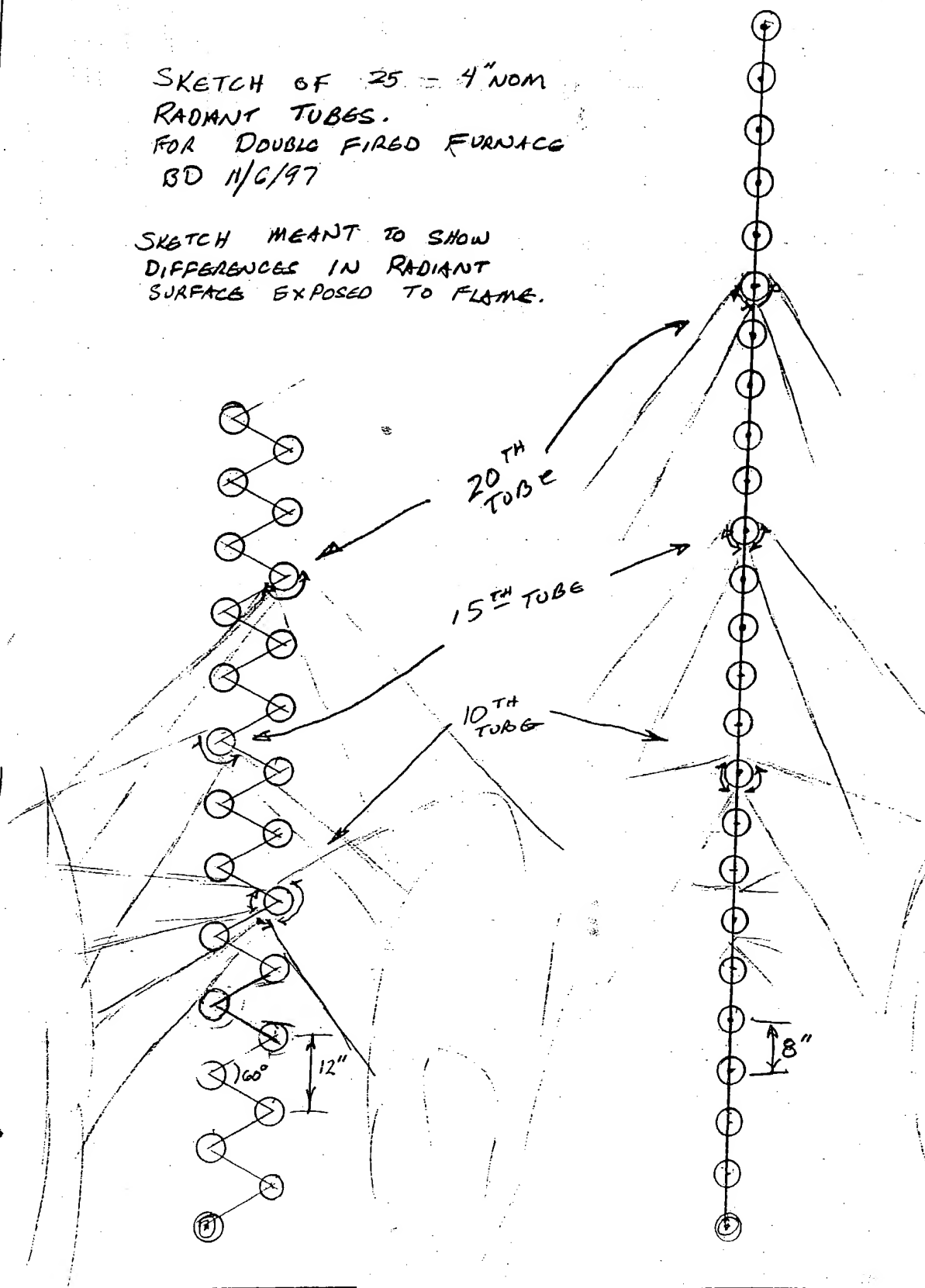
Brian Doerksen  
file oddcoil.wp

A diagram of a zigzag chain structure, likely representing a polymer chain. The chain consists of a series of circles connected by lines, forming a zigzag pattern. The angle between the segments is labeled as  $60^\circ$ . A vertical dimension line on the right indicates a height of  $12''$ .

(DIMENSIONS + ANGLES  
REPRESENTATIVE OF ONE CASE)


$$\frac{1}{2}'' \approx 1'$$

SKETCH MEANT TO SHOW DIFFERENCES IN RADIANT SURFACE EXPOSED TO FLAME.


$$\frac{1}{2}'' = 1 \text{ ft}$$

Coke Technology Alliance  
Steering Committee Meeting  
September 30, 1999

Meeting Minutes

ATTENDEES

Bechtel

Conoco

AGENDA

The Steering Committee meeting was held at Bechtel's Houston office in 6C529. Several Coke Alliance Team members took part in the Steering Committee Meeting and their participation is reflected in the agenda.

The meeting agenda is attached as a Word document (September 30 Agenda.doc). Electronic copies of all of the handouts used during the meeting are also attached.

The following notes represent my assessment of what went on during our meeting. Basically the notes are arranged in the order in which we discussed the agenda items. **Action items are included at the end of the minutes in a bold font.**

**ACTION ITEMS FROM JULY MEETING - UPDATE**









#### **FURNACE CFD PRESENTATION**

joined the Steering Committee to make a presentation about the Furnace CFD model being developed by Bechtel. The model appears to be very comprehensive. However, set up of the model appears to be very time consuming (up to one month before the model is providing output). The model appears to be best suited for "retrofit" furnace applications rather than a grassroots furnace design tool.

**ACTION ITEM:** The Technology Committee will address the applicability of this model regarding coker furnace applications and make a recommendation (go or no-go) to the Steering Committee.





**ACTION ITEM LIST – September 30, 1999**

4. The Technology Committee will address the applicability of the CFD model regarding coker furnace applications and make a recommendation (go or no-go) to the Steering Committee.

**COKE AND CARBON PRODUCTS IP MEETING**

**SEPTEMBER 14, 1999**

***ATTENDEES***

and Bill Hall.

The ICR estate and patent estate for which this team has responsibility was reviewed. The result of this review, it was determined that all currently held patents for which no additional annuities, taxes, or other expenses are due should be maintained and should not be brought up again.

**All patents under the following codes should be maintained:**

**Continue Prosecution:**

**Search and File if Patentable:**

– the decision was to search, to determine patentability. If patentable, proceed with filings in U.S. and foreign countries.

WDH:slm  
September 15, 1999  
GROUP\LEGAL\COKEMTG\DECISIONS 14SEP1999.DOC

## Radiant Furnace CFD Model Validation Study December 1999 Status

### Scope Completed as of December 1999

- has developed the Furnace CFD model
- Data Acquisition Plan
- contract modification awaiting funding approval

### Scope remaining

- Approve revised funding request
- Approve contract modification
- Develop contract for equipment rental and technician for data gathering
- Schedule field data gathering
- Evaluate test data and develop input for Furnace CFD model
- Run Furnace CFD model and compare to test data
- Calibrate Furnace CFD model
- Prepare report
- Prepare COE report

### Budget

- Current budget
- Cost expended through December 1999 -
- Forecast Total Cost -

### Areas of concern:

- Approved budget did not include cost to gather & evaluate field data and coordinate study.

**Bechtel Confidential**



1999 COST SUMMARY - FURNACE CFD PHASE I



CONOCO-BECHTEL  
COKER ALLIANCE

TECHNOLOGY DEVELOPMENT

10/1/99 to 12/31/99

Coke Technology Alliance  
Steering Committee Meeting  
March 1, 2000

Meeting Minutes

ATTENDEES

Bechtel

Conoco

The Steering Committee meeting was held at Conoco's Houston office in MA 2079 from 11:30 AM until about 5:30 PM.

The meeting agenda is attached (to the email message) as a Word document (SC Meeting Agenda for 1 March 00.doc). An electronic version of the handout (components) used during the meeting was made available and is also attached to the email message.

The following notes represent my recollection of what went on during our meeting. Basically the notes are arranged in the order in which we discussed the agenda items. **Action items are included at the end of the minutes in a bold font.**

AGENDA

BECHTEL ORGANIZATION



#### **TECHNOLOGY DEVELOPMENT – Status of Current Programs**

Furthermore, only projects that have been screened and approved by the Technology Committee and submitted to the Steering Committee (with appropriate scope, deliverable and budget definitions) and, subsequently, approved by the Steering Committee will be considered to be a part of the Technology Development budget.

**Action Item:** The Steering Committee decided that the coordinator could manage the projects, but that the Technology Committee would have periodic reviews to ensure deliverables are being met.

The Steering Committee also decided that no additional funds would be spent on Technology Development projects until controls are implemented and the Technology Committee recommends which projects to pursue further.

**The Technology Development budget will be "closed" (no additional charges) until the Technology Committee comes back with its recommendation.**

**Furnace CFD**

The budget has basically been spent developing a demonstration model without tuning it to actual operations. BeTec says that their estimate did not include taking the necessary data to tune the model and data has not been collected from (shutdowns and contract issues are delaying this effort).

**Action Item: The Technology Committee will review and make a recommendation regarding going forward with this effort. No additional effort will be conducted pending the Technology Committee recommendation.**











**CONOCO-BECHTEL COKER ALLIANCE  
STEERING COMMITTEE MEETING**

**DECEMBER 7, 2000  
BECHTEL OFFICE – ROOM 6C529**

**AGENDA**

## ATTENDEES

CONOCO

BECHTEL

## TECHNICAL DEVELOPMENT

### Committee Members

Technology Committee will resume its activities with Les Roussel as leader in December. Committee members will be the following:

Les Roussel – Conoco

Brian Doerksen – Conoco

### Status of Previous Programs/New Developments

The committee will identify, review and prioritize all items to be addressed by the committee. The following are some of the items that will be included in the lists:

- Furnace CFD – review past data and make recommendation on path forward.

**Bechtel – Conoco Coke Alliance  
Steering Committee Meeting Minutes  
Dec. 7, 2000**

**Attendees**

Conoco

Bechtel

**Old Action Items**

The list of action items from the previous Steering Committee meeting was reviewed. See attached action item list for updates.

**Steering Committee Membership**

The Steering Committee approved the following changes to the Steering Committee membership:

**Bechtel Organization**

**Financial Update**









### **Technology Development**

Les Roussel will take the lead role on the Technology Committee. The Steering Committee will approve the projects to be worked on by the Technology Committee. Les will also be accountable to present recommended projects to the Steering Committee with established costs, deliverables and intermediate milestones. Les will also manage the cost associated with these projects.

### **Miscellaneous**

and Les Roussel to recommend a schedule for Steering Committee meetings for all of 2001.

**New Carbon Products and Global Carbon  
Intellectual Property Team s  
Meeting notes  
January 10<sup>th</sup>, 2001**

The meeting opened with a discussion of the expectations and deliverables from the Intellectual Property Teams. It was recognized that resources are being stretched with considerably increased activity in IP issues. The team decided to design and implement a process to :

**New Coke ICR's**

Coker heater design for double-fired process furnace.

Decision: Apply for a patent.

Inventor(s): Brian Doerksen

will develop a process for IP management in the future. In the meantime, the following process will be followed for this meeting's outcome:

Team Lead  
Sean  
Supervisors

Issue minutes

Notify the inventors. Rick will take the "A"

Draft the patent applications

Award distributions. Notifications will go to the inventors and their supervisors. The supervisors will be accountable for awards.



Sean

Clarify the August meeting results

Cheryl S. Ratcliffe  
Legal Secretary  
Intellectual Property  
DNA-Legal

Conoco Inc.  
McLean Building, Suite 2083  
600 N. Dairy Ashford, Houston, Texas 77079  
P.O. Box 4783, Houston, Texas 77210-4783  
Phone: (281) 293-5523  
Fax: (281) 293-3700  
E-Mail: cheryl.s. ratcliffe@usa.conoco.com

January 18, 2001

Mark G. Kachigian, Esq.  
Head, Johnson & Kachigian  
Moore Manor  
228 West 17<sup>th</sup> Place  
Tulsa, OK 74119

Re: Approved to be Filed ICRs

Dear Mark:

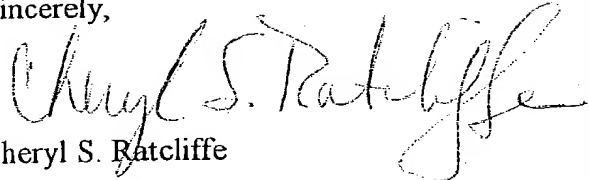
Pursuant to the request of Sean Sun, enclosed are copies of the below-listed ICRs. These are being forwarded to you as a result of the decisions of the Global Carbon/Coke IP Team meeting held on January 10, 2000. Please begin drafting patent applications on each ICR according to the recommendations of the committee noted below.

"Alternative Coil Arrangement for Double Fired Process Furnaces" –  
We received your letter of March 20, 2000 regarding the

January 18, 2001  
Page 2

If you have any questions, or if I may be of further assistance, please do not hesitate to contact me.

Sincerely,



Cheryl S. Ratcliffe

Enclosures

cc: Sean Sun (w/o Enclosures)  
Joanna K. Payne (w/o Enclosures)

-----Original Message-----

**From:** Ward, John D [[SMTP:jdward@bechtel.com](mailto:jdward@bechtel.com)] <<mailto:jdward@bechtel.com>>  
**Sent:** Friday, March 02, 2001 7:57 AM  
**To:** Roussel, Les (Conoco); Hughes, Gary(Conoco); Doerksen, Brian (Conoco); Romero, Sim; Ward, John D; Vincent K. Leung (E-mail)  
**Cc:** Fister, Lynn; Akhter, Adeel  
**Subject:** RE: Technology committee work items

Les,

Attached is the completed proposal form for the "Staggered Furnace Coil" initiative.

<<Technology Development form\_Stag Coil.doc>>

John D. Ward  
Tel: (713) 235 4412  
Fax: (713) 235 3037  
Email: [JDWard@Bchtel.com](mailto:JDWard@Bchtel.com)

-----Original Message-----

**From:** Roussel, Les J. [[SMTP:Les.J.Roussel@usa.conoco.com](mailto:Les.J.Roussel@usa.conoco.com)] <<mailto:Les.J.Roussel@usa.conoco.com>>  
**Sent:** Thursday, February 22, 2001 2:14 PM  
**To:** Gary C. Hughes (E-mail); Brian J. Doerksen (E-mail); Romero, Sim;

Ward, John D; Vincent K. Leung (E-mail)  
Cc: Fister, Lynn  
Subject: Technology committee work items

Just a reminder that I need the project sheets for the top ten items submitted to me so that I can get funding approved. Attached is the top ten list and form that needs to be filled out.

Please submit the completed forms to me by Mar. 2.

Thanks,

<< File: TechCmtelist.xls >> << File: Technology Development form.doc >>

Les Roussel  
Conoco Inc.  
600 N. Dairy Ashford Rd.  
Houston, TX 77079  
phone: 281-293-2894  
fax: 281-293-1446  
email: [les.j.roussel@usa.conoco.com](mailto:les.j.roussel@usa.conoco.com)



Technology  
Development form\_St

## Coking Alliance Technology Development

### Project Approval Form

#### Description of Project

This is an alternate (staggered) furnace coil arrangement that has the potential to increase coker heater run lengths.

#### Project Champion

#### Current Status of Technology/Project

Further scope definition is required to clarify and verify patent application claims. The Alliance has decided to proceed with a patent application pending technical verification. Technical verification may take the form of using traditional furnace design practices or computational fluid dynamics (CFD). This proposal incorporates the use of CFD.

#### Benefits of Project

The main perceived benefit is the potential for increased coker furnace run length. This will be a significant selling point if heat transfer rates can be manipulated to minimize coking rates and maximize run lengths.

#### Deliverables (list intermediate milestones and dates if possible)

Technical Report to quantify advantages, including:

- Coil arrangement drawing
- Estimated effect on run length compared to typical double fired design
- Cost estimate comparisons with typical double fired design
- CFD model

#### Manpower Requirements

Conoco – 100 hours – 1 Furnace engineer to review/validate report.

Bechtel – 800 hours – 1 CFD modeller, p/t Furnace engineer, p/t Process engineer.

#### Estimated Cost

#### Estimated Completion Date

#### Approved by Steering Committee

-----Original Message-----


**From:** Sun, H N. (Sean)  
**Sent:** Friday, May 04, 2001 9:09 AM  
**To:** Roussel, Les J.; Doerksen, Brian J.; Hughes, Gary C.  
**Subject:** Alternate coil heater arrangement patent application ICR 97/026

To all:

Just want to let you know that I got a call from Mark Kachigian yesterday afternoon. They just discovered that they have a conflict on this application. and they can no longer handle this case.

If you have objections or other suggestions, please let me know.

*Sean*

H. N. "Sean" Sun, counsel   
Telephone 281-293-2128  
Fax: 281-293-3700  
email: [h.n.sun@usa.conoco.com](mailto:h.n.sun@usa.conoco.com)  
Room: ML 2112, Houston

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